4.3 Impact to Permafrost

If your landfill is in an area with permafrost, it is important to design and operate the landfill to keep the underlying permafrost frozen. If the landfill settles and water is pooling, it has the potential to affect the permafrost so the operator must take corrective action. (18 AAC 60.227)

Why do we worry about the presence of permafrost?

Many research studies over the past couple of decades have reported that the annual average temperature of permafrost is increasing. Although it still maintains a temperature below freezing, it is becoming more unstable both in areas of continuous and discontinuous permafrost. As waste decomposes, it generates heat that, without good separation and operations, can thaw the permafrost beneath the landfill.

Landfill built on a thick pad to protect the permafrost beneath it.

How do we operate a landfill built on permafrost?

It is important to remember that if a landfill is located on permafrost, trenches and pits should not be dug as these will quickly fill with water in the summer months. The landfill must be an area fill that is built up to protect the permafrost.

It is especially important not to allow water to pond within landfills built on permafrost. Ponded water can absorb and hold substantial heat, which reduces the insulating value of the landfill pad. This can then cause thawing of the permafrost beneath the pad. Once begun, this thawing effect can quickly spread through the underlying permafrost. This is difficult to reverse, but corrective action must be taken and will require an engineered solution.

Examples:

An example of a landfill built on a pad above permafrost prior to waste placement

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